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PATENT APPLICATION

ATTORNEY DOCKET NO. 200206606-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): David Claramunt

Application No.: 10/607,873

Filing Date: 6-28-2003

Confirmation No.: 7105

Examiner: Dave A. Ghatt

Group Art Unit: 2854

Title: Media marking for optical sensing of media

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Commissioner For Patents
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TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 10-13-2005.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $120	☐ 2nd Month $450	☐ 3rd Month $1020	☐ 4th Month $1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 500. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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Rev 10/05 (ApiBrief)

NOV 29 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First named Applicant: David Claramunt Application No.: 10/607,873 (CONF 7105) Filed: 6/28/2003 Title: Media marking for optical sensing of media advancement Attorney Docket No.: 200206606-1	Group Art Unit: 2854 Examiner: Dave A. Ghatt

Assistant Commissioner for Patents
Washington, D.C. 20231

APPEAL BRIEF

This Appeal Brief is organized in accordance with the requirements set forth in 37 CFR 1.192(c).

Real party in interest

The real party in interest in this patent application is Hewlett-Packard Development Company, L.P., of Houston, Texas.

Related appeals and interferences

There are no related appeals or interferences to the present patent application.

Status of claims

Claims 1-8 are pending in the patent application, and stand rejected, as summarized in the issue presented for appeal, below. Claim 1 is an independent claim, from which claims 2-8 ultimately depend. The other claims filed in this patent application, claims 9-23, were withdrawn in an election made in response to a restriction requirement, and are not subject to this appeal.

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Status of amendments

None of claims 1-8 were amended from the point of the filing of the application to the present appeal. That is, none of claims 1-8 were amended in any of the two office action responses previously submitted by Applicant.

Summary of claimed subject matter

The invention relates to a method which advances media (claim 1), and then "mark[s] the media as the media advances to allow for one-dimensional optical sensing *of advancement of the media* while accommodating for lateral movement of the media." (Claim 1) The italicized portion of claim 1 is what is at issue in this appeal. That is, the claimed invention is directed to optical sensing of *media advancement*. While the other parts of the claimed invention are important, Applicant focuses on the media advancement sensing limitation as the point of distinction between the prior art as cited by the Examiner and the present invention. That is, the other parts of the claimed invention – such as the accommodation of lateral movement of the media during such sensing – are not important insofar as the present appeal is concerned, and therefore they are not discussed here. Thus what follows is a bit of background material as to what media advancement "is," and why sensing media advancement during printing is important.

The background section of the patent application as originally filed provides a good synopsis as to what optical sensing of media advancement is and why it is needed. First, however, by way of background information, it is noted the background section states that "[i]mage-forming devices are frequently used to form images on media, such as paper." (P. 1, ll. 6-7) Such "[i]mage-forming devices include laser printers, inkjet printers, and other types of printers and other types of image-forming devices." (P. 1, ll. 7 9)

The way that such image-forming devices can typically work, and where media advancement sensing is primarily an issue, is that a printhead of such an image-forming device prints a horizontal "swath" on a page, advances the page a little bit so that the printhead is positioned over the next swath, prints on this swath, and so on. That is, as stated in the

background section, "[t]he image-forming mechanism of the device, such as an inkjet-printing mechanism [e.g., such as a printhead], may move in a direction perpendicular to that in which the media moves through the image-forming device." (P. 1, ll. 10-14)

Perhaps the easiest way to visualize this is to open the cover of nearly any typical inkjet printer that may be found in one's home or office. There's a printhead under the cover, which is the thing in which you insert ink cartridges when you have run out of ink, for instance. During printing, what happens is that a horizontal portion of the media sheet in question is immediately underneath the printhead, which is usually the short side or the width of the sheet. From left-to-right this horizontal portion of the media sheet is the current "swath." The printhead moves back and forth over the swath and prints on that swath (e.g., such as by ejecting ink onto that swath). The media sheet is then advanced vertically a bit, along the long side or the length of the sheet, so that a new and different horizontal portion of the sheet is now underneath the printhead. This is the kind of media advancement that is the subject of the claimed invention. The printhead thus moves back and forth over the new swath to print on that swath, and the process is repeated until the media sheet has been completely printed on.

Now, getting back to the claimed invention, the reason why media advancement is important is as follows.

> For high-quality image formation, the movement of the media through an image-forming device is desirably precisely controlled. If the media moves more than intended, there may be gaps in the resulting image formed on the media, whereas if the media moves less than intended, there may be areas of overlap in the resulting image. An optical image-recognition media-advance sensor can be used to measure media advancement . . . .

(P. 1, ll. 15-20) Therefore, when you advance a sheet of media to go from one swath that has just been printed on to the next swath, you don't want there to be any gaps between these two swaths, and you don't want there to be any overlap between these two swaths, or otherwise image quality degrades. This is why sensing media advancement precisely is important. For example, you can manually force the effects of such gaps in particular by pulling on the paper in an inkjet printer while it's being advanced, during printing. The paper will advance too much, as a result of your

pulling, and there will be a gap between the swath that the printer had just printed on and the next swath that the printer prints on.

Therefore, the claimed invention as explicitly limited in claim 1 is directed to optical sensing of *advancement of media* (while accommodating for lateral movement of the media). As noted above, the part of the claimed subject matter that is focused on in this appeal is such media advancement sensing. While the other parts of the claimed invention are important – such as the accommodation of lateral movement of the media during such sensing – they are not important insofar as the present appeal is concerned, and therefore have not been discussed here.

Issues

For the purposes of this appeal, there is a single issue: whether the US patent reference Christiansen et al. (6,411,324) anticipates the claimed invention, as to claim 1 in particular, under 35 USC 102(b). More specifically, the issue is whether Christiansen *inherently* senses *media advancement*, as to which the claimed invention is limited. As will be discussed below, the Examiner has essentially admitted that Christiansen does not *explicitly* sense media advancement, but rather has stated that Christiansen *inherently* senses media advancement while sensing media alignment.

Applicant notes that only claims 1-4 were rejected on the basis of anticipation under 35 USC 102(b) as to Christiansen. The other claims 5-8 were rejected on the basis of obviousness under 35 USC 103(a) over Christiansen in view of another reference. However, claims 5-8 ultimately depend from independent claim 1, and therefore insofar as claim 1 is patentable, claims 5-8 are patentable as well. Therefore, the issue of patentability of claims 1-8 insofar as the present appeal is concerned rises and falls on whether Christiansen particularly anticipates the claimed invention of claim 1.

Grouping of claims

For purposes of this appeal only, Applicant groups all pending claims 1-8 within a single group, and selects claim 1 as representative of these claims. Claim 1 reads as follows (all the pending claims 1-8 are listed at the end of this brief), where a particular portion of claim 1 has been emphasized as the point of contention in this appeal:

1. A method comprising:

advancing media; and,

marking the media as the media advances to allow for one-dimensional optical *sensing of advancement of the media* while accommodating for lateral movement of the media.

Argument

Applicant's argument can be summarized as follows. First, Christiansen does not *explicitly* disclose sensing of *media advancement*, as to which the claimed invention is limited, but rather only teaches, discloses, or suggests sensing of *media alignment*. Second, Christiansen does not *inherently* disclose sensing of *media advancement*, as to which the claimed invention is limited, because *media advancement* sensing is *not* inherent to Christiansen's disclosed *media alignment* sensing. Therefore, Christiansen cannot be considered to anticipate the claimed invention. Both parts of this argument are now presented.

Christiansen only explicitly discloses media alignment sensing, not media advancement sensing

Christiansen discloses marking the media with "calibration marks" used to ensure that printing is accomplished completely from edge-to-edge on the media, as opposed to marks used to optically sense *advancement* of the media. Christiansen specifically discloses the following.

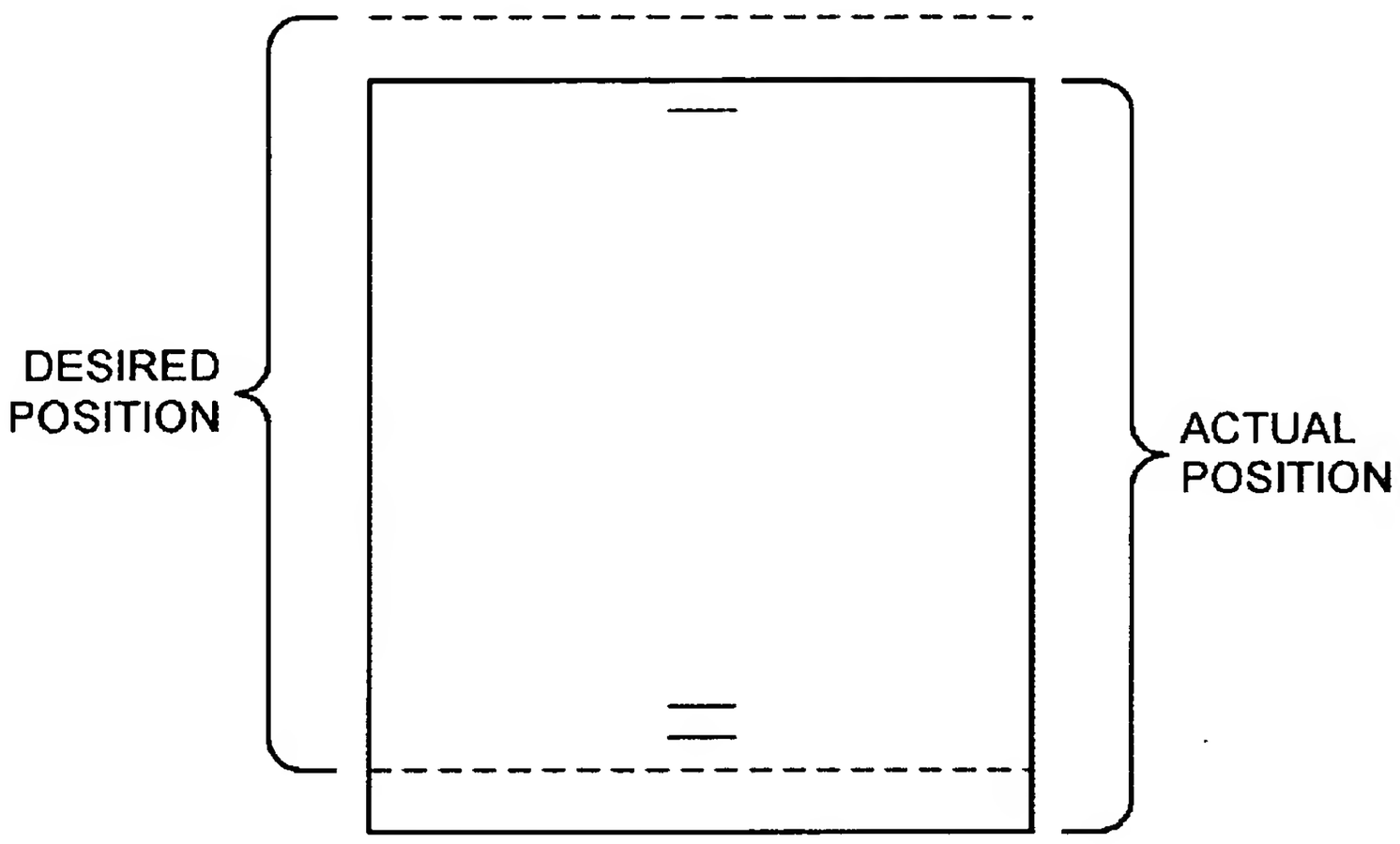
> FIGs. 3A and 3B depict a calibration page showing the placement of calibration marks on misaligned sheets. FIG. 3C shows how the output of the printer would appear when the page is aligned with the printer engine. *The calibration marks provide a visual indication of how to provide adjust [sic] a printer mechanism to align the mechanism to the page edges.*

. . . .

> Each of the pages depicted in FIG. 3 convey information *about the relative alignment of the laser print engine mechanism* that produced the pages. In FIG. 3A, the starting print position of the print engine is off-center and *"lost" output off the right-hand side of the page*. Accordingly, the print engine should be "aligned" to start printing sooner, or further left of the left edge of the paper 300. . . .
>
> In FIG. 3B, *print output was lost along the right-hand margin inasmuch as there were fewer lines on the left-hand side as on the right-hand side.* An appropriate correction to center the print output would act to move the print starting point toward the right-hand side of the paper 300.
>
> In FIG. 3C, *there are an equal number of calibration marks along both left and right margins.* . . . No calibration of the print engine starting point, or other adjustment is required to center subsequently printed pages.

(Col. 4, ll. 18-58) Looking at FIGs. 3A-3C of Christiansen, you can see what is going on. As in FIG. 3C, desirably there are four marks printed on the left and right edges of the media. In FIG. 3A, there are only two marks on the right edge of the media, indicating that the other two marks on the right edge are being "cut off," in that printing should start sooner, further left of the edge of the media. FIG. 3B shows the reverse situation, where printing starts too late.

This explanation of what Christiansen does is further explained by reference to the following diagram A:



In this diagram, the media is desirably aligned from top to bottom between the two dotted lines, but is actually aligned from top to bottom as shown, "downwards" from the desired position. That is, the actual position of the media is shifted downwards from where it is desired to be, or "should be." Christiansen tries to mark two horizontal lines at the top edge of the media and at the bottom edge of the media, where the media is desirably aligned (i.e., where the media "should be"). Because the media is actually down a bit from where it "should be," one of the marks is not actually printed at the top edge of the media, but both of the marks are printed at the bottom edge of the media. This diagram A from the top edge of the media to the bottom edge of the media is similar to what Christiansen depicts in FIG. 3B from the left edge of the media to right edge of the media. Therefore, substituting the word "top" for the word "left," and the word "bottom" for the

word" right in column 4, lines 45-50 (where this particular excerpt was noted above as originally presented in Christiansen)[1]

> In FIG. 3B, print output was lost along the *bottom* margin inasmuch as there were fewer lines on the *top* side as on the *bottom* side. An appropriate correction to center the print output would act to move the print starting point toward the *bottom* side of the paper.

That is, what you want to do is start printing a little later than if the media were in the desired or expected position in diagram A, because the media in diagram A is in actuality a little farther down vertically than where you had expected it. This is because two alignment marks should have been printed on both the top side and the bottom side of the media in diagram A. Because only one mark was printed on the top side of the media, however, it can be concluded, per Christiansen, that the media is aligned too far downwards. To print "edge to edge," then, you would start printing a little later – i.e., a little further downward – so nothing is cut off at the top. That is, as stated in Christiansen, "the lines that actually appear at . . . the top and bottoms of a page . . . will provide a visual indication of the relative placement of the page with respect to the starting print position(s)." (Col. 3, ll. 59-62)

Christiansen's calibration or alignment marks are thus made to ensure that the print engine is aligned with the media so that edge-to-edge printing can occur – i.e., so that printing properly starts right at the left edge (and top edge) of the media, and ends right at the right edge (and bottom edge) of the media. Christiansen's calibration or alignment marks are optically sensed as follows.

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[1] This substitution is made because Christiansen is largely described in relation to left edge-to-right edge misalignment, where here we discuss top edge-to-bottom edge misalignment. For instance, Christiansen informs us in column 6, lines 39-44 that

> Those skilled in the art will recognize that the method disclosed herein is also useful to print edge to edge from the top to the bottom of a page. For this reason, a "left" edge or margin and a "right" edge or margin should be construed to be equivalent to and include a "top" and "bottom" edge or margin of a page.

> [S]ignals from the [optical] scanner 292 can be used to detect the calibration marks, including their placement along the various edges of the media 200 on which they were printed. In such an embodiment, a print starting point calibration operation can be fully automated such that when calibration marks are laid down by the print engine, their placement on the page can be automatically detected by the scanner and controller, which reads the scanner output signals 292. The controller can thereupon issue appropriate correction signals to the print engine to print successive pages using the previously detected registration marks *as indicators of where to start and stop printing so as to achieve full width output.*

(Col. 5, ll. 53-65) Thus, the calibration of the registration marks are optically sensed so that the print engine can be aligned for subsequent pages of media to achieve edge-to-edge printing properly, by appropriately changing the start and stop printing points.

In this respect, Christiansen's calibration marks are very different than the marking accomplished by the claimed invention. In the claimed invention the media is marked as the media advances to allow for one-dimensional optical sensing of *advancement* of the media. As an example of media advancement, Applicant again quotes the background section of the patent application as originally filed, as was quoted above.

> For high-quality image formation, the movement of the media through an image-forming device is desirably precisely controlled. *If the media moves more than intended, there may be gaps in the resulting image formed on the media, whereas if the media moves less than intended, there may be areas of overlap in the resulting image. An optical image-recognition media-advance sensor can be used to measure media advancement*, which functions by capturing media images at two different times and comparing them to discern how much the media has advanced. Thus, the sensor should capture images of something on the media that the movement of which can be discerned.

(P. 1, ll. 15-23) Media advancement, in other words, has to do with the advancement of media while printing on the media. For example, a swath of the media is printed on, then the media is advanced, another swath of the media is printed on, and so on. If the media advancement between printing of the swaths is too great, then there is an undesirable gap between the swaths, whereas if the media advancement is too little, then there is undesirable overlap between the

swaths. Thus, the claimed invention marks the media as the media advances to allow for one-dimensional optical sensing of "advancement" of the media.

Christiansen, then, does not disclose such marking of the media for one-dimensional optical sensing of advancement of the media, and therefore does not anticipate the claimed invention. Christiansen discloses marking the media not for subsequent optical sensing of *advancement* of the media (to prevent gaps and overlaps), as in the claimed invention, but rather for subsequent optical sensing of *alignment* of the media vis-à-vis the print engine (to achieve edge-to-edge printing without "cut offs" at either edge). Because Christiansen does not disclose marking the media to allow for one-dimensional optical sensing of "advancement of the media," it does not and cannot anticipate the claimed invention.

Christiansen does not inherently disclose advancement sensing in disclosing alignment sensing

As has just been discussed, what Christiansen does is mark alignment marks on the top and bottom edges of the media, and then detects them so that it knows where to start printing. The question therefore is, does sensing these marks on the top and bottom edges of the media for alignment purposes *inherently* sense the advancement of the media. Let us first start with the legal standard for inherency. "Inherency . . . may not be established by *probabilities* or *possibilities*. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." (In re Oelrich, 212 USPQ 323, 326 (CCPA 1981)) "Under the principles of inherency, if a structure in the prior art necessarily functions in accordance with the limitations of a process or method claim of an application, the claim is anticipated." (In re King 231 USPQ 136, 138 (Fed. Cir. 1986)) So, for Christiansen's sensing of marks to determine the alignment of media to inherently disclose the claimed invention's sensing of marks to determine the advancement of media, such sensing for media alignment must "necessarily" sense for media advancement as well, and not "probably" or "possibly" also sense for media advancement.

Therefore, to show lack of inherency, what we can do is provide examples in which Christiansen senses for alignment *without* sensing for advancement. Such examples prove that

sensing for alignment does not necessarily sense for advancement as well, and *at best* "probably" or "possibly" senses for advancement, such that, per the legal standard of inherency, alignment sensing does not *inherently* rise to the level of advancement sensing. That is, if Christiansen's apparatus senses for alignment without necessarily having to sense for advancement, then it senses for alignment without inherently sensing for advancement under the legal standard of inherency noted above – and thus does not anticipate the claimed invention.

Going back to diagram A that was presented above, it is easy to see how Christiansen's alignment sensing works. At the top edge of the media, you move horizontally over the media, attempting to print two lines. Then you go back over this edge of the media, and detect how many lines were actually printed on the page. Because only one line was printed at the top edge of the media in diagram A, you can conclude that the media is too far downwards, and printing on the page should start a little further downwards than originally planned.

What if, instead of in diagram A, the media were perfectly aligned with or too far upwards compared to the desired position? In that case, both lines would be printed and detected at the top edge of the media, and the only thing you could conclude is that the media is not too far downwards – it is either too far upwards, or is perfectly aligned vertically. Therefore, you would advance to the bottom edge of the media, and attempt to print two lines at the bottom edge of the media. Then you again go back over this edge of the media, and detect how many lines were actually printed. If less than two lines were printed, then you can conclude that the media is too far upwards; if both lines were printed, then the media is perfectly aligned vertically.[2]

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[2] It is noted that this description of how sensing for media alignment is accomplished in Christiansen is consistent with the description of FIGs. 3A, 3B, and 3C in Christiansen, in column 4, lines 16-58, except that we focused here on top-to-bottom alignment, and not left-to-right alignment as column 4, lines 16-58 do (and as noted in the footnoted text of footnote 1, Christiansen describes left-to-right alignment as exemplarily and inclusive of top-to-bottom alignment). That is, the calibration marks (i.e., lines) "provide a visual indication of how to provide adjust [sic] to a printer mechanism to align the mechanism to the page edges." (Col. 4, ll.

This description of how Christiansen accomplishes media alignment sensing should make it clear that such sensing does not *inherently* sense media advancement. When detecting marks at the top edge of the media, for instance, you don't have to advance the media at all, and thus don't have to detect whether media advancement properly occurred. Rather, you can simply move horizontally over the top edge of the media and try to print a number of lines, and then move horizontally over the top edge again to see if the desired number of lines were actually printed on the media. The media remains stationary the entire time, and does not *have* to be advanced (vertically) at all to sense media alignment. Therefore, for sensing media alignment at the top edge of the media, Christiansen does not *necessarily* sense media advancement, and indeed, *probably* does *not* sense media advancement.

Similarly, when detecting marks at the bottom edge of the media, you also don't have to advance the media at all. To be sure, the media will have to be advanced to get to the bottom edge so that you can print marks there. But Christiansen doesn't perform any sensing "on the way" from the top edge to the bottom edge of the media. Rather, once Christiansen gets to the bottom edge of the media, it performs the same process: moving horizontally over the bottom edge and printing a number of lines, and then moving horizontally again over the bottom edge to see if the desired number of liens were actually printed. The media remains stationary the entire time, and does not *have* to be advanced at all to sense media alignment. That is, for sensing media alignment at the bottom edge of the media, too, Christiansen does not *necessarily* sense media advancement, and indeed, *probably* does not sense media advancement.[3]

22-24) The "number of lines . . . can be correlated to the relative position of the paper . . . . In other words, the lines that actually appear at . . . the top and bottom of a page . . . provide a visual indication of the relative placement of the page with respect to the starting print position(s)." (Col. 3, ll. 57-62)

[3] It should be clear that left-to-right alignment of the media also would not necessarily even require media advancement and thus would not necessarily require sensing of media advancement. For instance, in FIGs. 3A-3C of Christiansen, it would be quite easy to print the left marks

Let's look at one final example to show why, in Christiansen, it is not inherent that sensing the alignment of the media, by sensing its marks that have been made on the media, also senses the advancement of the media. Envision a flat-bed plotter in which a sheet of media is placed stationary on a bed, and pens are moved back and forth and up and down over the media to create a desired image on the media. In this case, Christiansen's alignment sensing still works perfectly well – you can print lines on the left and the right sides to check left-to-right alignment and you can print lines on the top and the bottom sides to check top-to-bottom alignment – and the media does not move at all! In fact, this flat-bed plotter example is probably the easiest way to see why Christiansen does not require media advancement sensing when performing media alignment sensing – even if Christiansen is "probably" going to be used in a setup other than a flat-bed plotter, as the Court of Claims and Patent Appeals has been excerpted above, "[i]nherency . . . may not be established by probabilities or possibilities."

Applicant finishes this discussion of inherency and Christiansen vis-à-vis the claimed invention by analyzing the particular excerpt of Christiansen that the Examiner believes justifies that alignment sensing in Christiansen necessarily requires advancement sensing. As stated by the Board of Patent Appeals and Interferences, "when an examiner relies on inherency, it is incumbent on the examiner to point to the 'page and line' of the prior art which justifies an inherency theory." (Ex parte Schricker, 56 USPQ2d 1723, 1725 (BPAI 2000)) Here, in the final office action of July 14, 2005, page 2, paragraph 3, the Examiner has pointed us to column 5, lines 29-52 of Christiansen as inherently teaching one-dimensional optical sensing of advancement of the media. In relevant part, this passage of Christiansen reads as follows:

302/306/310 and the right marks 304/308/312 in a single swath without advancing the media at all. Applicant focused on the top-to-bottom alignment of the media in Christiansen, indeed, because it is the "harder" case, since you do advance the media to get from the top edge to the bottom edge of the media. Thus, if top-to-bottom alignment sensing does not require media advancement sensing, then left-to-right alignment sensing also cannot require media advancement sensing.

> [T]he detection of the calibration marks on a calibration page can be accomplished using an optical sensor 290. As shown in FIG. 2, any appropriate optical sensor 290, which is positioned to "read" pages output from the print engine 210 can be used to sense or detect the calibration marks printed onto a calibration page.

There is nothing here that justifies the Examiner's inherency theory, to use the terminology of the Board of Patent Appeals and Interferences. Basically, this excerpt of Christiansen just says that an optical sensor can be used to detect the calibration marks printed on a calibration page. However, as has been discussed above, the calibration marks can be detected for sensing media alignment without necessarily sensing media advancement, even when using an optical sensor. Even if optically sensing alignment *probably* senses advancement, optically sensing alignment does not *necessarily* sense advancement, as has been described above, and thus does not *inherently* encompass sensing advancement. For all of these reasons, then, Christiansen does not anticipate the claimed invention.

Conclusion

Applicant believes that the pending claims are in condition for allowance, and requests that they so be allowed, for the reasons described above.

Respectfully Submitted,

11-29-2005
Date

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Listing of claims on appeal

1. (original) A method comprising:

advancing media; and,

marking the media as the media advances to allow for one-dimensional optical sensing of advancement of the media while accommodating for lateral movement of the media.

2. (original) The method of claim 1, wherein marking the media as the media advances comprises marking the media with a mark size matching a field of view of an optical sensor used in the one-dimensional optical sensing of the advancement of the media that allows for the one-dimensional optical sensing of the advancement of the media while accommodating for the lateral movement of the media.

3. (original) The method of claim 1, wherein marking the media as the media advances comprises, as the media advances in a first direction, marking an irregular pattern on the media over a plurality of tracks in a second direction perpendicular to the first direction.

4. (original) The method of claim 3, wherein marking the irregular pattern on the media the plurality of times in the second direction comprises marking the irregular pattern on the media over two tracks in the second direction.

5. (original) The method of claim 3, wherein marking the irregular pattern on the media comprises marking a plurality of valleys followed by a space devoid of a valley on the media as the media advances.

6. (original) The method of claim 1, wherein marking the media as the media advances comprises two-dimensionally roughening the media as the media advances.

7. (original) The method of claim 6, wherein two-dimensionally roughening the media as the media advances comprises roughening the media across a width of the media.

8. (original) The method of claim 6, wherein two-dimensionally roughening the media as the media advances comprises roughening the media across less than a width of the media.

9.-23. (withdrawn, and thus not presented here since these claims are not at issue in this appeal)